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1948  
UNITED STATES DEPARTMENT OF AGRICULTURE  
2) U.S. PRODUCTION AND MARKETING ADMINISTRATION,  
2a FRUIT AND VEGETABLE BRANCH

3  
SHIPPING POINT HANDBOOK FOR GREEN CORN

Carlots shipments of green corn originate principally in Florida, Texas, Louisiana and Alabama. The heaviest movement occurs during April, May, June and July, with the peak movement taking place in June. (1)

Commercial shipments of green corn comprise two classes which are commonly known as "sweet" or "sugar" corn and "roasting ears." The latter is usually an early maturing variety of field corn. It may be as tender as sweet corn but is never as sweet. Early shipments from Texas formerly consisted largely of "field" corn. Recently there has been a considerable increase in the production of yellow sweet corn. (2)

The ears of sweet corn are usually smaller than those of field corn and the husks are generally darker green in color with ribbon like ends which hang free, lending to the ear a somewhat ragged appearance instead of being tightly wrapped around the cob to the extreme tip as in the case of field corn. (3)

The principal varieties of sugar corn grown for commercial purposes are Snowflake, Silver Mine, Stowells Evergreen and Favorite. On account of seed mixtures, it would not be advisable for inspectors to attempt to certify varieties but they may show any variety markings that appear on the containers. Mixtures of stock showing white and yellow kernels would not meet grade specifications for "similar varietal characteristics." (4)

Green corn is usually shipped under refrigeration in order that the stock may arrive at terminal markets in fresh condition. Inspectors should note whether bunkers are filled with ice and the load also top iced, or if top icing is used alone. In some sections corn shipped in barrels may be packed with crushed or broken ice. (5)

The most popular container used for green corn in Florida is the pepper crate (11x14x22), but bushel crates and eggplant crates are also used. Some corn producing States or sections use sugar barrels, round bushel baskets or open mesh bags. (6)

This brief instruction is intended to show the terms and description to be used under the certificate headings of PACK, SIZE, QUALITY and CONDITION and GRADE, with a brief discussion of quality and grade factors. For instructions on filling out the general certificate headings, refer to the Inspectors Handbook. (7)

METHOD OF SAMPLING

At least one sample should be drawn for each 20 containers for small lots and a minimum of 15 samples for carlots, with additional samples when factors are irregular. Since the grade tolerances are determined by count, (8)

25 ears should make a satisfactory sample except where it is necessary to determine the count to verify the packing marks or to obtain facts for the settlement of disputes in regard to pack or number of ears in containers. General notes should be made for color and condition of husks, length or size of ears. The inspector will need to pull back the husk from the tip of each ear examined to determine how well the ears are filled with kernels, the condition of maturity, presence of worm injury, smut, etc., and examine the outside of the husk for the same reasons. Inspectors should avoid unnecessary or careless stripping of husks that will cause losses to the shipper and repack the ears again by the original method.

#### CONDITION OF PACK

- (9) For corn packed in crates the terms very tight, tight, fairly tight or slack may be used to describe the pack.
- (10) When the containers are crates, barrels or baskets the terms well filled, fairly well filled or slack may be used.
- (11) The amount of slackness should be stated in inches, or the pack may be described by mentioning the height of the bulge, if any.
- (12) Corn is usually packed in containers with ears in tight layers and laid parallel and on account of the protection afforded by the husks, a high bulge is usually obtained without material damage to the kernels.

#### Examples:

- (1) (Crates) Generally tight pack, ears arranged tightly in layers. Tops and bottoms of crates show 1 to 2 inch bulge. Few crates fairly tight pack.
- (2) Bags well filled with ears packed parallel throughout.
- (3) (Baskets) Mostly fairly tight, in some baskets contents loose to slightly slack. Ears jumble packed.

#### SIZE

- (13) It should be noted that the U. S. Standards specify that the length of cob, whether clipped or unclipped, shall be not less than 5 inches. Although this minimum length is specified for the cob, it is thought that it seldom should be necessary to strip the husks back to the butt of the ear to determine the length of the cob.
- (14) As no additional tolerance is permitted for undersize cobs, they shall be included with the defects.
- (15) Ears of corn may be described by showing the minimum and maximum length of cobs and a statement relative to the minimum length.



Examples:

- (1) Cobs range in length from 6 to 11, mostly 7 to 9 inches in length. None under 5 inches in length.
- (2) All ears clipped; length of cobs generally range from 5 to 8 inches; 3% by count, of cobs clipped to less than 5 inches in length.

QUALITY AND CONDITION

- (16) (1) Trimming and Clipping. As these terms are closely allied to the appearance of ears of corn they are discussed together in this paragraph. Either poor trimming or improper clipping may cause an ear to have a ragged appearance. The term "clipped" is a new term in the U. S. Standards. It concerns the practice of some packers of removing worm injury by cutting off the end of the ear. While this practice may cause such ears to be less attractive than unclipped ears having no worm injury, they are far more desirable than unclipped ears having up to  $1\frac{1}{2}$  inches of worm frass. It should be noted under the "damage" definition that when ears have been clipped, no worm injury whatever is permitted. (The standards also require that, unless otherwise specified, ears shall not be clipped to less than 5 inches. See Size)
- (17) "Well trimmed" means that the ears are practically free from loose husks and that the shank shall not extend more than 1 inch beyond the point of attachment to the outside husk.
- (18) "Fairly well trimmed" would describe a lot of corn where there was a noticeable amount of loose husks and some shanks more than 1 inch in length. This term should not be used when the lot meets U. S. No. 1 or Fancy grade.
- (19) "Poorly trimmed" should be used when not "fairly well trimmed" or "well trimmed."
- (20) "Properly clipped" means that the end of the ear has been neatly cut off at approximately a right angle to the longitudinal axis.
- (21) "Poorly clipped" may be used when ears are not "properly clipped."
- (22) (2) Shape of Ears. Ears which are fairly straight and smooth may be described as well formed. Ears which are badly bent or crooked or of irregular shape or form should be considered as misshapen and scored against grade.
- (23) (3) Arrangement of Rows and Kernels on Cob.
  - (a) Well filled-when the rows of kernels show fairly uniform development and the appearance or eating quality is not materially affected by poorly developed rows.

Clipped ears should have practically no poorly developed or missing kernels at the tip end of the cob. On unclipped ears, not more than one-fourth

the length of the cob may have poorly developed or missing kernels at the tip end. An interpretation for both clipped and unclipped ears has been used which limits poorly developed or missing kernels on other portions of the cob to one square inch. This area should apply to small ears and a proportionately larger area should be allowed on large ears. The 1 inch area mentioned for small ears is suggested only as a guide and should be modified by considerations of other important factors of quality, as well as size of cob. The inspector should not be too technical in measuring such areas.

- (b) Fairly well filled when cobs are not well filled but most of the rows are filled out with edible kernels.  
(Not U. S. No. 1)
- (c) Poorly filled would describe ears where kernels or rows are widely scattered due to incomplete pollination and the ears are of small value for eating purposes.

(4) Immature Ears consist of ears on which the kernels are small, poorly developed, lack plumpness and are of very little value for eating purposes. (24)

(5) Mechanical injuries. Broken, mashed or injured cobs should be scored as a defect when the appearance or eating quality is materially affected. (25)

(6) Worms and Worm Injury caused by the corn ear worm is probably the most serious defect of green corn and the subject of most disputes between shippers and receivers. Inspectors should exercise every care to determine the percentage of ears affected, the extent and place of damage, and the size or stage of development of the worms if they are present. The U. S. Fancy grade provides that the corn must be free from injury by insects, which means that all ears showing any degree of worm injury must be taken care of in the 10% tolerance. The U. S. No. 1 grade provides that the corn be free from damage by insects. Damage, as applied to insect injury (or by corn ear worms), has been defined as injury extending more than 1-1/2 inches from the top of the cob, or worm injury affecting kernels in other portions of the cob. Therefore when worm injury is present in a lot of green corn, inspectors must measure the injured portion to determine whether the injury is to be scored as a defect against grade or treated as a minor blemish. However, when a considerable percentage of minor worm injury is present (that cannot be scored as a defect) the fact should be reported on account of the possible growth of worms and extension of injury in transit. For example: "Approximately 30% of ears show slight worm injury extending from 1/2 to 1 inch from tips of cobs, worms present." (26)

Clipped ears must be free from worm injury.

(27) The following points should be noted as being important factors of Condition:

- (28) (1) Freshness - A statement in this respect will give an idea of condition and appearance of a lot. According to the facts the proportion of fresh, wilted or withered husks should be shown.
- (29) (2) Color - The facts under this heading are most important in bringing out the age, appearance or sales value of green corn. Inspectors may describe as: "Husks generally green color," "dark green color" or "husks on some turning yellow," or "husks on few ears yellow to brown color," etc. In some cases it may be necessary to show the fraction or percentage of ears in a lot having turning or yellowing husks.
- (30) (3) Maturity. The maturity or age of kernels may be shown as:

Tender, plump and milky when kernels are well formed and filled with milk-like juice and offer only slight resistance to pressure or:

Turning hard when kernels toughen somewhat, contain very little juice, are slightly dented and contents becoming mealy.

Hard when kernels are overmature and too hard or tough for table use and usually deeply dented.

Immature kernels are very small, very soft, and watery rather than milky.

- (31) (4) Decay in corn may be easily identified by tannish to dark brown color of affected portions of husks or kernels which is usually accompanied by a more or less thick or slightly sticky slime.
- (32) Smut is caused by a fungus disease which may be readily identified by the pink to black kernels affected and the black dust like smut produced by the fungus growth which usually appears at the tip of the ear. Smut infected ears may later become affected with slimy types of decay when stock becomes moist and heated in transit or temporary storage.

Examples: (Quality and Condition)

- (33) (1) (U. S. Fancy) Stock is fresh, well trimmed, and well formed, husks generally dark green color. Cobs well filled with tender, plump and milky kernels. Grade defects within tolerance. No decay.
- (34) (2) (U. S. No. 1) Stock is fresh, well formed and well trimmed, husks show good green color, cobs generally well filled with plump and milky kernels, few ears kernels turning hard. Grade defects range from 6 to 10 percent, averaging 7%, consisting principally of hard and worm damaged ears. No decay. About 20% of stock shows slight worm injury extending less than 1-1/2 inches from tips of ears.



(3) (Unclassified) Corn ears are generally well formed and well (35)  
filled, mostly green color, fairly well to poorly trimmed. Many ears  
one to three outer husks turning yellow. Kernels on most cobs plump and  
milky but on some ears turning to hard. Grade defects range from 10  
to 35 percent, averaging about 25 percent, consisting of hard, poorly  
trimmed and worm damage. Less than 1% decay.

(4) (U. S. No. 1) Ears clipped, fresh, well formed, and well (36)  
trimmed; husks show good green color, cobs generally well filled with  
plump milky kernels, few ears kernels turning hard. Grade defects range  
from 6 to 10 percent, averaging 8 percent, consisting principally of  
cobs clipped to less than 5 inches. No decay.

GRADE

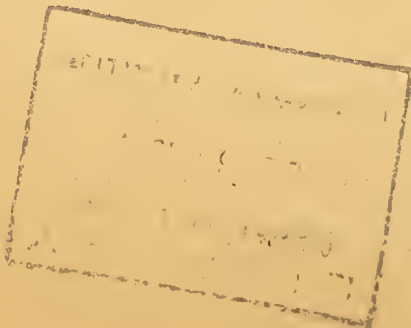
Make a positive statement showing the grade of each lot inspected. (37)

Examples:

- (1) U. S. Fancy.
- (2) U. S. No. 1.
- (3) U. S. No. 1 Clipped to 4 inches.

(4) Unclassified. Stock fails to grade U. S. No. 1 because of  
defects in excess of the tolerance allowed but stock averages approxi-  
mately 75% of U. S. No. 1 quality.

March 21, 1945





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UNITED STATES DEPARTMENT OF AGRICULTURE  
PRODUCTION AND MARKETING ADMINISTRATION  
FRUIT AND VEGETABLE BRANCH

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SHIPPING POINT INSPECTION

OF

GREEN CORN

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Washington, D. C.  
November 1950

For Use of U. S. D. A. Fresh Fruit and Vegetable Inspectors Only

Agriculture - Washington



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UNITED STATES DEPARTMENT OF AGRICULTURE  
PRODUCTION AND MARKETING ADMINISTRATION  
FRUIT AND VEGETABLE BRANCH

FRESH FRUIT AND VEGETABLE INSPECTION SERVICE

SHIPPING POINT INSPECTION OF GREEN CORN

PRODUCTION AREAS

Green corn is shipped from many states throughout the country, beginning (1)  
in Florida during the latter part of March and continuing through September  
from Wisconsin and Michigan. The heaviest carlot movements are during April,  
May and June principally from Florida, Texas, Alabama, and Louisiana. The  
majority of green corn is packed in the field although a considerable portion  
is shed-packed.

INSPECTION METHODS

The inspector should select his samples from representative closed (2)  
containers in order to determine the damage, if any, in the packing process.  
The number of samples taken for inspection will depend upon the number of lots  
in the car. Not less than 10 samples should be examined. Even though the  
lot is small, the inspector should examine at least two samples. Since the  
grade factors are determined by count, 25 ears should make a satisfactory  
sample under normal condition, except where the net count is to be verified.  
When count is marked on the container, the inspector should count the contents  
from enough containers in each lot to assure himself that the count require-  
ments are met, or whether the variation exceeds that allowed in the Standards.  
General notes should be made for color and condition of husks, length of cob  
and cleanness. In order to determine the filling of the cob, maturity, worm  
damage, smut, etc., it will be necessary to remove part of the husk so that  
the ear is exposed. This is best accomplished by making a cut with a knife  
starting 3 or 4 inches from the tip and cutting either at right angle or  
slightly diagonal to the tip end. This will allow the husk to be pulled back  
for examination and to be easily closed by releasing the husk. The practice  
of making a moon-shaped cut or a "window cut" is of no value in determining  
the filling, worm injury, or other defects of the cob and should not be done.  
It only leaves an unsightly hole that cannot be covered up. Before making  
the cut, the inspector should feel the ear to determine whether there are  
any unfilled spots. The poorly filled spot will sink under slight pressure  
on the husk. The cut should be made at this point to avoid making more  
than one cut.

Green corn is generally precooled by immersion in cold water. The (3)  
corn is passed through vats of water containing ice or cooled by mechanical  
refrigeration. Proper precooling depends upon the efficiency of the pre-  
cooler and the length of time the corn is in the precooler. It is usually  
more practical to make the inspection before the corn is precooled. The corn  
is dry and there is no unnecessary warming up of the corn while making the  
inspection. The inspector should open up a container occasionally after

precooling to determine any change in condition of husks, such as freshening up after the immersion. Slightly wilted husks will come out fresh. There is no objection to making the inspection after the precooling is completed.

#### PRODUCTS INSPECTED

See S. P. H. Paragraphs 34, and 142 to 161.

- (4) Practically all Green Corn shipped is of the hybrid varieties, with the yellow varieties predominating. The practice of shipping field corn for "roasting ears" has largely been discontinued. It is not advisable for inspectors to attempt to name the varieties on the certificate, but they may quote the variety markings on the container. It should be further identified by showing the color or type, as "White Type Green Corn," or "Yellow Type Green Corn." Stock showing a mixture of white and yellow kernels on the same ear, or white and yellow ears, or sweet and field corn mixed in sacks, would not meet the requirements for "similar varietal characteristics."
- (5) There are no standard size containers used for green corn. Various states use various sizes and types. Some states prefer crates and others sacks. Since this commodity is sold entirely by the dozen, the size of container will necessarily be determined by the count, as well as the size of the ears. The inspector should not certify the size of the container but quote the volume marks if present. For example: "..... sacks stenciled 1 bu." The inspector should show the count markings when present.

#### LOADING

- (6) Green Corn requires good refrigeration to aid it in arriving at terminal markets in a fresh condition. The inspector should be careful to note the method of loading which may or may not have a bearing on the condition of the shipment. Sacks and crates are generally loaded with spaces between rows and next sidewalls in order to allow the ice to sift down to the floor. Sacks are usually loaded with car strips between layers. This allows better circulation of air. Shippers usually top ice the load to the ceiling of the car after loading, as well as having the bunkers filled with ice. Ice is frequently placed between layers while loading. All these practices have a direct bearing on the shipment and should be noted on the certificate. The amount of top ice should be shown in inches or feet.

Examples: 1. Sack load: Through lengthwise spaced load 5 rows, 8 layers, except between doors 4 stacks crosswise, 4 rows. All layers each stack double cross stripped, except between doors double lengthwise stripped. Crushed ice between rows, next walls and about 3 feet over top of load.

2. Crate load: Through lengthwise spaced load 8 rows, 5 layers. All layers double stripped and nailed. Crushed ice between rows, next walls and about 18 inches over top of load.

Clipped Corn in sacks is usually loaded with the clipped ends down so that water from the ice will not run into the ears, but no mention need be made on the certificate of this factor. (7)

#### PACK

Corn in crates is usually packed tight in layers and laid parallel, with butt and tip ends reversed. On account of the protection afforded by the husks, a slight bulge is usually obtained without material damage to the kernels. (8)

When the corn is packed in sacks, it is not necessary to mention the filling of the sacks. Where the ears are placed parallel to the bottom of the sacks, it is advisable to state this fact. For example: "Ears packed parallel throughout sacks." (9)

When the corn is packed in crates, the following defined terms should be used to describe the pack: (10)

Very Tight. Too tight for best results and too much bulge resulting in bruising of ears next lids.

Tight. Package is filled sufficiently to prevent any movement of the product within the package and it has the proper bulge for the most desirable pack.

Fairly Tight. Ears are in contact with lid which prevents movement of the ears within package, but no bulge is present.

Slightly Slack. The package is not sufficiently full to prevent the movement of product within the package, but there is no appreciable space between lids and product.

Slack. The package is not full and free movement of the product within the package is permitted. This term must be qualified in terms of inches or half inches below lids.

#### SIZE

The U. S. No. 1 grade requires, that unless otherwise specified, the length of each cob, whether clipped or unclipped, shall be not less than 5 inches. The U. S. Fancy grade requires that the length of the cob shall be not less than 6 inches. Clipped ears cannot grade U. S. Fancy. Although this minimum length is specified for the cob, it should not be necessary to strip back the husks of the ear to determine the length of the cob. (11)



(12) The size should be described by the minimum and maximum length in inches or half inches. If the range is wide, a mostly statement should be used. A positive statement should always be made about undersize. For example: "No undersize," or, "none under 5 inches in length," or "under-size within tolerance." If cobs are clipped, it should be mentioned under this heading.

(13) The U. S. Standards allow an additional tolerance of 5% for ears which do not meet the requirements as to length of cob. Individual samples may contain double the tolerance, provided the lot as a whole averages within the 5% tolerance specified. The entire contents of the container must be examined before a lot is thrown out of grade on account of exceeding double the tolerance for undersize in individual samples. The inspector should keep in mind that the shipper may elect to lower the minimum length on a lot of U. S. No. 1 corn and should keep his notes in such a manner as to be able to give him the minimum length a lot will make without another examination. It may be necessary to keep more than one size heading on the note sheet. When lots fail to meet the specified minimum length because some samples exceed double the tolerance, the shipper may want this fact stated on the certificate. The inspector should use general terms in describing this point as—"most samples cobs generally range from 5 to 7 inches in length, some samples cobs generally range from 4-1/2 to 6 inches. From 2 to 20%, average approximately 7% under 5 inches. None under 4-1/2 inches in length."

(14) If count is shown on the container, the inspector should determine whether the markings are correct. If they are correct the statement, "Meets count requirements as marked," will usually be sufficient. If most containers meet the count requirements, and some or many do not, the following statement should be used: "Most crates (or sacks) meet count requirements as marked, some (or many) crates contain 5 ears less than count marked." If count is not marked on the container, no mention need be made of this factor under size unless requested to do so. If count is to be certified and the variation exceeds that allowed in the Standards, the actual range and average should be shown.

Examples of Size Statements:

1. (count marked on container) Cobs clipped, from 5 to 8 inches, mostly 5-1/2 to 7 inches in length. Average 2% under 5 inches in length. Conforms to marked count.



2. (Containers not marked for count) Cobs generally range from 5-1/2 to 7 inches in length. No undersize. Count ranges from 55 to 63, average 59 ears per sack.
3. (Containers not marked for count) Cobs generally range from 5-1/2 to 9 inches, mostly 6 to 7-1/2 inches in length. No undersize.
4. (Containers marked for count) Cobs range from 6 to 7-1/2 inches in length. None under 6 inches in length. Count ranges from 55 to 65, average 60 ears per crate.

#### QUALITY AND CONDITION

##### 1. Trimming and Clipping

As these terms are closely allied to the appearance of ears of corn, they are discussed together in this paragraph. Either poor trimming or improper clipping may cause an ear to have a ragged appearance. Clipping concerns the practice of removing worm injury or damage by cutting off the end of the ear. While this practice may cause such ears to be less attractive than those not clipped and having no worm injury or damage, they are far more attractive than those having up to 1-1/2 inches of worm injury or frass. It is permissible to have unclipped and well-trimmed clipped ears in the same container in the U. S. No. 1 Grade. It should be kept in mind that, unless otherwise specified, ears shall not be clipped to less than 5 inches in length. All grades require that the ears be well trimmed. The U. S. No. 1 grade requires each clipped ear to be properly clipped. (15)

The following terms should be used to describe trimming and clipping:

Well Trimmed. Means the ears are practically free from loose husks and the shank is not more than 6 inches in length and does not extend more than 1 inch beyond the point of attachment of the outside husk.

Poorly Trimmed. Means the ears are not well trimmed. Poorly trimmed ears are defects.

Properly Clipped. Means that either the end of the cob, or the end of the cob and husk have been neatly removed at approximately a right angle to the longitudinal axis.

Poorly Clipped. Means the ears are not "properly clipped." They should be scored as defects.

## 2. Shape of Ears

- (16) The U. S. Standards require ears to be well formed. This means they must be fairly straight and smooth. Ears which are badly bent, crooked, irregularly shaped, badly stunted, or otherwise ill formed are not U. S. No. 1 and should be scored as defects. Nubbins are not well formed.

## 3. Filling of Ears

- (17) The U. S. Standards require that the cobs shall be well filled with plump and milky kernels.

The following terms should be used to describe filling of ears:

Well Filled Means that the rows of kernels show fairly uniform development and the appearance or eating quality is not materially affected by open or poorly developed rows. Clipped ears should have practically no poorly developed or missing kernels at the tip end of the cob. On ears not clipped, not more than one-fourth the length of the cob may have poorly developed or missing kernels at the tip end. The grade allows one square inch of poorly developed or missing kernels on other portions of the ear on a cob 6 inches in length, and a proportionally greater area on a longer cob and a smaller area on a shorter cob.

Fairly Well Filled. Means the cob is not well filled but most of the rows are filled out with edible kernels. Fairly well filled cobs are not U. S. No. 1.

Poorly Filled. Means the ear has less than one-half the length of the cob filled with well developed kernels, or the kernels or rows are widely scattered, and the ear is of little value for eating purposes. Such cobs are not U. S. No. 1.

## 4. Immature Ears

- (18) Immature ears are ears on which the kernels are small, poorly developed, watery, or lack plumpness and are of very little value for eating purposes.

## 5. Mechanical Injuries

- (19) Broken cobs, mashed or injured kernels should be scored as defects when the appearance, eating, or shipping quality is materially affected. Mashed or injured kernels at shipping point are more subject to decay than sound healthy kernels.

6. Worms and Worm Injury.

Worms and worm injury caused by the corn ear worm is probably the most serious defect of green corn and the subject of most disputes between shippers and receivers. Inspectors should exercise every care to determine the percentage of ears affected, the extent and place of damage, and the size or stage of development of the worms if they are present. The U. S. Fancy grade requires that the ears shall be free from worms and insect injury. This means that worms shall be scored as a defect of this grade whether or not they have caused any injury, and that worms and any injury by other insects must be taken care of in the 10% tolerance. The U. S. No. 1 grade provides that the corn be free from damage by insects. Damage, as applied to insect injury (or by corn ear worm), is defined as injury extending more than 1-1/2 inches from the tip of the cob on unclipped ears, or worm injury affecting kernels in other portions of the cob. Therefore, when worm injury is present in a lot of green corn, inspectors must measure the injured portion to determine whether the injury is to be scored as a defect or treated as a minor blemish. However, when a considerable percentage of minor worm injury is present (that cannot be scored as a defect) the fact should be noted on the certificate because of the possible growth of worms and extension of the injury in transit. Example: "Approximately 30% of ears show slight worm injury extending from 1/2 to 1 inch from tips of cobs, (not affecting grade) worms present." (20)

Any worm injury other than at the tip of the ear is considered as damage and should be scored as a grade defect. (21)

Clipped ears must be free from worm injury. Therefore, any worm injury remaining after clipping must be considered as damage and scored as a grade defect. (22)

7. Freshness.

Fresh as defined in the Standards refers to husks not badly wilted, dried, or turning yellow or brown. Therefore, "fresh," or "slightly wilted," would still meet the requirements of U. S. No. 1, whereas, "wilted," or, "dried," husks would not meet the requirements for grade and would be scored as a defect. (23)

8. Color.

The color of the husk is one of the most important factors of appearance or sales value of green corn. Occasionally, a shipper will trim the ears rather close so that the dark green outer husks are removed, and the remaining husks are of a light green to dark green color. This light green color may be only on the lower portion of the ear or the entire outer husk may be of light green color. This should not be confused with "yellow," or, "turning yellow" husks. "Light green," "green," or "dark green," husks meet the requirements of the U. S. Grades, whereas, "turning yellow," "yellow," "turning brown," or "brown," would be defects and scored under the 10% tolerance. (24)



9. Well Covered

- (25) This means that the husk practically enfolds the entire cob and that the husks are of sufficient number to protect the ear under normal handling. Ears with husk slit and left open are not well covered.

10. Maturity

- (26) The maturity or age of kernels should be determined by pressing the kernels with the thumb nail about one-third the distance from butt to tip of the cob with sufficient force to break the kernel. The back of the nail should be used and not the edge. The following terms should be used to describe the maturity.

Tender, Plump and Milky Means the kernels are well formed and filled with milk-like juice and offer only slight resistance to pressure.

Turning Hard Means the kernels are slightly dented, somewhat tough to pressure, contain very little juice, and the contents mealy. (Not U. S. No. 1 and should be scored as a defect).

Hard Means the kernels are overmature and too hard or tough for table use and are usually deeply indented. (Not U. S. No. 1 and should be scored as a defect).

11. Decay

- (27) Decay in corn may be easily identified by tannish to dark brown color of affected portions of husks or kernels which is usually accompanied by a more or less thick or slightly sticky slime. The tolerance for decay is 2%, however, individual containers may show not more than 4%, provided the average for the lot does not exceed 2%.

12. Smut

- (28) This is the most common disease of corn. It is caused by a fungus disease which may be readily identified by the pink to black kernels affected and the black dust-like smut produced by the fungus growth which usually appears at the tip of the ear. Smut infected ears may later become affected with slimy types of decay when stock becomes moist and heated in transit or storage. All visible stages of this disease are to be considered as damage and scored against all grades.



GRADE

Always make a positive statement showing the grade of each lot inspected.

(29)

Examples:

1. U. S. Fancy
2. U. S. No. 1.
3. U. S. No. 1, 4 inch minimum.
4. Fails to grade U. S. No. 1 account grade defects in excess of tolerance, but averages approximately 80% U. S. No. 1 Quality.
5. Fails to grade U. S. No. 1 account undersize but grades U. S. No. 1, 4 inch minimum.
6. Averages 85% U. S. No. 1 Quality, 4 inch minimum.
7. Averages approximately 80% U. S. No. 1 Quality.

REMARKS

Restricted Inspections.

Occasions may arise where the inspector is unable to make an inspection of the entire load or the shipper desires inspection only on certain marks in the load. The shipper may not be willing to make the entire load accessible for inspection, or the inspector may be unable to make an inspection of the last load placed in the car. In such cases, the inspector must not attempt to certify what he does not see, but must restrict his certificate to that portion of the load actually inspected. These restrictions should be shown under "Remarks."

(30)

Examples:

1. Inspection and certificate restricted to upper 3 layers of load.
2. Inspection and certificate restricted at applicant's request to stock in one bushel sacks. Manifest shows car also contains 300 1/2 bushel sacks not covered on this certificate.

Inspectors may be requested to make statements under this heading by shipper pertaining to the shipment such as: (lot inspected on platform and later loaded into car) "Applicant states above-described lot to be loaded into car number ART 23416."

GENERAL EXAMPLES

(31) Example Number 1

Products: Yellow Type GREEN CORN in open mesh sacks stenciled, "One Bu., Texas Green Corn, Produce of U. S. A." Manifested as 360 sacks.

Loading: Through lengthwise load; 5 layers, 8 rows. Ventilating space between rows and next sidewalls. Car strips between each layer. Approximately 3 feet crushed ice over load.

Pack: Ears packed parallel throughout.

Size: Cobs generally range from 5 to 11, mostly 6 to 8 inches in length. None under 5 inches in length.

Quality and Condition: Stock fresh, clean, generally well trimmed, well formed, well covered. Husks light green to good green color. Cobs well filled with plump and milky kernels. Grade defects within tolerance. No decay.

Grade: U. S. No. 1.

Example Number 2

Products: Yellow Type GREEN CORN in wirebound crates labeled, "PEE-HO-KEY, Everglades Growers Cooperative, Pahokee, Florida," marked, "5." Applicant's count 640 crates.

Loading: Through lengthwise load; 5 and 6 layers, 8 rows. Layers double stripped and nailed. Ventilating space between each row and next sidewall. Approximately 2 feet crushed ice over top of load.

Pack: Generally tight, few fairly tight.

Size: Cobs generally range from 5-1/2 to 9 mostly 6 to 8 inches in length. No undersize. Meets count requirements as marked.

Quality and Condition: Stock fresh, clean, generally well trimmed, well covered, and well formed. Cobs well filled with plump and milky kernels. Husks good green color. Most ears show slight worm injury affecting from 1/2 to 1 inch at tip of cob (not affecting grade). Grade defects range from 4 to 20%, averaging approximately 15%, consisting of worm damage and poorly trimmed. No decay.

Grade: Fails to grade U. S. No. 1 account grade defects in excess of tolerance. Averages approximately 85% U. S. No. 1 Quality.

Example Number 3

Products: White Type GREEN CORN in open mesh sacks stenciled, "7 dozen Green Corn, Produce of U. S. A." Manifested as 480 sacks.

Loading: Through lengthwise and crosswise load. 3 to 7 rows, 5 layers. Approximately 5 feet crushed ice over load.

Size: Cobs generally clipped 4 to 7 inches in length. None under 4 inches. Count ranges from 81 to 88, averaging 85 ears per sack.

Quality and Condition: Stock fresh, clean, well trimmed, well covered and well formed. Husks dark green color. Cobs well filled mostly with plump and milky kernels. Grade defects range from 10 to 30%, averaging approximately 20%, consisting of turning hard and hard kernels. No decay.

Grade: Fails to grade U. S. No. 1, 4 inch minimum, account grade defects in excess of tolerance. Averages approximately 80% U. S. No. 1 Quality, 4 inch minimum.

Example Number 4

Products: Yellow Type GREEN CORN in crates stenciled, "5 dozen Green Corn." Loader's count 640 crates.

Loading: Through lengthwise, spaced load, 5 and 6 layers, 7 rows. Incomplete layer braced by 2x4 cleated to sidewalls. All layers double stripped and nailed. Crushed ice between rows, next walls and from 14 to 30 inches over top of load.

Pack: Mostly tight, some fairly tight, few 1 to 2 inches slack.

Size: Averaging 5% of cobs under 5 inches in length; ranging to 9 inches, mostly 5-1/2 to 7 inches in length. Meets count requirements as marked.

Quality and Condition: Stock is fresh, clean, well trimmed, well formed, well covered. Husks good green color. Cobs generally well filled with plump and milky kernels. Grade defects range from 8 to 18% average 14%, mostly poorly filled cobs. No decay.

Grade: Averaging approximately 80% U. S. No. 1 Quality.

Remarks: Inspection and certificate restricted to accessible portion of load consisting of stock in upper two layers of load.

Example Number 5

Products: Yellow Type GREEN CORN in open mesh sacks stenciled, "Green Corn," tagged 5 dozen ears. Checker's count 800 sacks.

Loading: Stacked on applicant's platform. See Remarks.

Pack: Ears packed parallel.

Size: Cobs generally range from 5 to 7 inches in length. From 3 to 12%, averaging 7% under 5 inches in length. None under 4-1/2 inches. From 55 to 64, average 60 ears per sack. Fails to meet count as marked account variation in number of ears in sacks.

Quality and Condition: Ears fresh, clean, well trimmed, well covered, well formed. Husks good green color. Cobs well filled with plump and milky kernels. Grade defects average 10%, consisting mostly of worm damage. No decay.

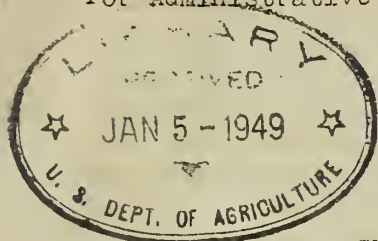
Grade: U. S. No. 1, 4-1/2 inch minimum.

Remarks: Applicant states above lot to be loaded in car PFE 71987.

\* \* \* \*



March 1945



WAR FOOD ADMINISTRATION  
OFFICE OF MARKETING SERVICES  
FRUIT AND VEGETABLE BRANCH

SHIPPING POINT HANDBOOK FOR GREEN CORN

Carlot shipments of green corn originate principally in Florida, (1)  
Texas, Louisiana and Alabama. The heaviest movement occurs during April,  
May, June and July, with the peak movement taking place in June.

Commercial shipments of green corn comprise two classes, which are (2)  
commonly known as "sweet" or "sugar" corn and "roasting ears." The latter  
is usually an early maturing variety of field corn. It may be as tender  
as sweet corn but is never as sweet. Early shipments from Texas formerly  
consisted largely of "field" corn. Recently there has been a considerable  
increase in the production of yellow sweet corn.

The ears of sweet corn are usually smaller than those of field corn (3)  
and the husks are generally darker green in color with ribbon like ends  
which hang free, lending to the ear a somewhat ragged appearance instead  
of being tightly wrapped around the cob to the extreme tip as in the case  
of field corn.

The principal varieties of sugar corn grown for commercial purposes (4)  
are Snowflake, Silver Mine, Stowells Evergreen and Favorite. On account  
of seed mixtures, it would not be advisable for inspectors to attempt to  
certify varieties but they may show any variety markings that appear on the  
containers. Mixtures of stock showing white and yellow kernels would not  
meet grade specifications for "similar varietal characteristics."

Green corn is usually shipped under refrigeration in order that (5)  
the stock may arrive at terminal markets in fresh condition. Inspectors  
should note whether bunkers are filled with ice and the load also top iced,  
or if top icing is used alone. In some sections corn shipped in barrels  
may be packed with crushed or broken ice.

The most popular container used for green corn in Florida is the (6)  
pepper crate (11x14x22), but bushel crates and eggplant crates are also used.  
Some corn producing States or sections use sugar barrels, round bushel bask-  
ets or open mesh bags.

This brief instruction is intended to show the terms and description (7)  
to be used under the certificate headings of PACK, SIZE, QUALITY and  
CONDITION and GRADE, with a brief discussion of quality and grade factors.  
For instructions on filling out the general certificate headings, refer  
to the Inspectors Handbook.

METHOD OF SAMPLING

At least one sample should be drawn for each 20 containers for small (8)  
lots and a minimum of 15 samples for carlots, with additional samples when  
factors are irregular. Since the grade tolerances are determined by count,

25 ears should make a satisfactory sample except where it is necessary to determine the count to verify the packing marks or to obtain facts for the settlement of disputes in regard to pack or number of ears in containers. General notes should be made for color and condition of husks, length or size of ears. The inspector will need to pull back the husk from the tip of each ear examined to determine how well the ears are filled with kernels, the condition of maturity, presence of worm injury, smut, etc., and examine the outside of the husk for the same reasons. Inspectors should avoid unnecessary or careless stripping of husks that will cause losses to the shipper and repack the ears again by the original method.

#### CONDITION OF PACK

- (9) For corn packed in crates the terms very tight, tight, fairly tight or slack may be used to describe the pack.
- (10) When the containers are crates, barrels or baskets the terms well filled, fairly well filled or slack may be used.
- (11) The amount of slackness should be stated in inches, or the pack may be described by mentioning the height of the bulge, if any.
- (12) Corn is usually packed in containers with ears in tight layers and laid parallel and on account of the protection afforded by the husks, a high bulge is usually obtained without material damage to the kernels.

#### Examples:

- (1) (Crates) Generally tight pack, ears arranged tightly in layers. Tops and bottoms of crates show 1 to 2 inch bulge. Few crates fairly tight pack.
- (2) Bags well filled with ears packed parallel throughout.
- (3) (Baskets) Mostly fairly tight, in some baskets contents loose to slightly slack. Ears jumble packed.

#### SIZE

- (13) It should be noted that the U. S. Standards specify that the length of cob, whether clipped or unclipped, shall be not less than 5 inches. Although this minimum length is specified for the cob, it is thought that it seldom should be necessary to strip the husks back to the butt of the ear to determine the length of the cob.
- (14) As no additional tolerance is permitted for undersize cobs, they shall be included with the defects.
- (15) Ears of corn may be described by showing the minimum and maximum length of cobs and a statement relative to the minimum length.

Examples:

- (1) Cobs range in length from 6 to 11, mostly 7 to 9 inches in length. None under 5 inches in length.
- (2) All ears clipped; length of cobs generally range from 5 to 8 inches; 3% by count, of cobs clipped to less than 5 inches in length.

QUALITY AND CONDITION

- (16) (1) Trimming and Clipping. As these terms are closely allied to the appearance of ears of corn they are discussed together in this paragraph. Either poor trimming or improper clipping may cause an ear to have a ragged appearance. The term "clipped" is a new term in the U. S. Standards. It concerns the practice of some packers of removing worm injury by cutting off the end of the ear. While this practice may cause such ears to be less attractive than unclipped ears having no worm injury, they are far more desirable than unclipped ears having up to  $1\frac{1}{2}$  inches of worm frass. It should be noted under the "damage" definition that when ears have been clipped, no worm injury whatever is permitted. (The standards also require that, unless otherwise specified, ears shall not be clipped to less than 5 inches. See Size)
- (17) "Well trimmed" means that the ears are practically free from loose husks and that the shank shall not extend more than 1 inch beyond the point of attachment to the outside husk.
- (18) "Fairly well trimmed" would describe a lot of corn where there was a noticeable amount of loose husks and some shanks more than 1 inch in length. This term should not be used when the lot meets U. S. No. 1 or Fancy grade.
- (19) "Poorly trimmed" should be used when not "fairly well trimmed" or "well trimmed."
- (20) "Properly clipped" means that the end of the ear has been neatly cut off at approximately a right angle to the longitudinal axis.
- (21) "Poorly clipped" may be used when ears are not "properly clipped."
- (22) (2) Shape of Ears. Ears which are fairly straight and smooth may be described as well formed. Ears which are badly bent or crooked or of irregular shape or form should be considered as misshapen and scored against grade.
- (23) (3) Arrangement of Rows and Kernels on Cob.

- (a) Well filled-when the rows of kernels show fairly uniform development and the appearance or eating quality is not materially affected by poorly developed rows.

Clipped ears should have practically no poorly developed or missing kernels at the tip end of the cob. On unclipped ears, not more than one-fourth



the length of the cob may have poorly developed or missing kernels at the tip end. An interpretation for both clipped and unclipped ears has been used which limits poorly developed or missing kernels on other portions of the cob to one square inch. This area should apply to small ears and a proportionately larger area should be allowed on large ears. The 1 inch area mentioned for small ears is suggested only as a guide and should be modified by considerations of other important factors of quality, as well as size of cob. The inspector should not be too technical in measuring such areas.

(b) Fairly well filled when cobs are not well filled but most of the rows are filled out with edible kernels.  
(Not U. S. No. 1)

(c) Poorly filled would describe ears where kernels or rows are widely scattered due to incomplete pollination and the ears are of small value for eating purposes.

(4) Immature Ears consist of ears on which the kernels are small, poorly developed, lack plumpness and are of very little value for eating purposes. (24)

(5) Mechanical injuries. Broken, mashed or injured cobs should be scored as a defect when the appearance or eating quality is materially affected. (25)

(6) Worms and Worm Injury caused by the corn ear worm is probably the most serious defect of green corn and the subject of most disputes between shippers and receivers. Inspectors should exercise every care to determine the percentage of ears affected, the extent and place of damage, and the size or stage of development of the worms if they are present. The U. S. Fancy grade provides that the corn must be free from injury by insects, which means that all ears showing any degree of worm injury must be taken care of in the 10% tolerance. The U. S. No. 1 grade provides that the corn be free from damage by insects. Damage, as applied to insect injury (or by corn ear worms), has been defined as injury extending more than 1-1/2 inches from the top of the cob, or worm injury affecting kernels in other portions of the cob. Therefore when worm injury is present in a lot of green corn, inspectors must measure the injured portion to determine whether the injury is to be scored as a defect against grade or treated as a minor blemish. However, when a considerable percentage of minor worm injury is present (that cannot be scored as a defect) the fact should be reported on account of the possible growth of worms and extension of injury in transit. For example: "Approximately 30% of ears show slight worm injury extending from 1/2 to 1 inch from tips of cobs, worms present." (26)

Clipped ears must be free from worm injury.



- (27) The following points should be noted as being important factors of Condition:
- (28) (1) Freshness - A statement in this respect will give an idea of condition and appearance of a lot. According to the facts the proportion of fresh, wilted or withered husks should be shown.
- (29) (2) Color - The facts under this heading are most important in bringing out the age, appearance or sales value of green corn. Inspectors may describe as: "Husks generally green color," "dark green color" or "husks on some turning yellow," or "husks on few ears yellow to brown color," etc. In some cases it may be necessary to show the fraction or percentage of ears in a lot having turning or yellowing husks.
- (30) (3) Maturity. The maturity or age of kernels may be shown as:

Tender, plump and milky when kernels are well formed and filled with milk-like juice and offer only slight resistance to pressure or:

Turning hard when kernels toughen somewhat, contain very little juice, are slightly dented and contents becoming mealy.

Hard when kernels are overmature and too hard or tough for table use and usually deeply dented.

Immature kernels are very small, very soft, and watery rather than milky.

- (31) (4) Decay in corn may be easily identified by tannish to dark brown color of affected portions of husks or kernels which is usually accompanied by a more or less thick or slightly sticky slime.
- (32) Smut is caused by a fungus disease which may be readily identified by the pink to black kernels affected and the black dust like smut produced by the fungus growth which usually appears at the tip of the ear. Smut infected ears may later become affected with slimy types of decay when stock becomes moist and heated in transit or temporary storage.

Examples: (Quality and Condition)

- (33) (1) (U. S. Fancy) Stock is fresh, well trimmed, and well formed, husks generally dark green color. Cobs well filled with tender, plump and milky kernels. Grade defects within tolerance. No decay.
- (34) (2) (U. S. No. 1) Stock is fresh, well formed and well trimmed, husks show good green color, cobs generally well filled with plump and milky kernels, few ears kernels turning hard. Grade defects range from 6 to 10 percent, averaging 7%, consisting principally of hard and worm damaged ears. No decay. About 20% of stock shows slight worm injury extending less than 1-1/2 inches from tips of ears.

(3) (Unclassified) Corn ears are generally well formed and well filled, mostly green color, fairly well to poorly trimmed. Many ears one to three outer husks turning yellow. Kernels on most cobs plump and milky but on some ears turning to hard. Grade defects range from 10 to 35 percent, averaging about 25 percent, consisting of hard, poorly trimmed and worm damage. Less than 1% decay. (35)

(4) (U. S. No. 1) Ears clipped, fresh, well formed, and well trimmed; husks show good green color, cobs generally well filled with plump milky kernels, few ears kernels turning hard. Grade defects range from 6 to 10 percent, averaging 8 percent, consisting principally of cobs clipped to less than 5 inches. No decay. (36)

#### GRADE

Make a positive statement showing the grade of each lot inspected. (37)

Examples:

- (1) U. S. Fancy.
- (2) U. S. No. 1.
- (3) U. S. No. 1 Clipped to 4 inches.

(4) Unclassified. Stock fails to grade U. S. No. 1 because of defects in excess of the tolerance allowed but stock averages approximately 75% of U. S. No. 1 quality.

March 21, 1945